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Michelle S. St. Paul

*Washington University in St. Louis*

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WASHINGTON UNIVERSITY IN ST. LOUIS

Department of Psychology

Social Networking Website Use and Eating Pathology: Relations, Moderators, and Motivation to  
Improve  
by  
Michelle Sylvia St. Paul

A thesis presented to the  
Graduate School of Arts and Sciences  
of Washington University in  
partial fulfillment of the  
requirements for the  
degree of Master of Arts

August 2015  
St. Louis, Missouri

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## Acknowledgements

I would first like to acknowledge Dr. Denise E. Wilfley for her support and encouragement throughout this study. I would also like to acknowledge our collaborators, Dr. Ellen Fitzsimmons-Craft, Dr. Danielle R. Ridolfi, Dr. Andrea E. Kass, and Dr. C. Barr Taylor (Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine).

This research was supported by a National Institute of Mental Health grant (R01MH081125) and a National Heart, Lung, and Blood Institute grant (T32 HL007456). I would like to acknowledge the numerous members of the Weight Management and Eating Disorders Program at Washington University in St. Louis for their contributions to study management.

Michelle Sylvia St. Paul

*Washington University in St. Louis*

*August 2015*

Dedicated to my parents and my brother.

## ABSTRACT OF THE THESIS

Social Networking Website Use and Eating Pathology: Relations, Moderators, and

Motivation to Improve

by

Michelle Sylvia St. Paul

Master of Arts in Psychology

Washington University in St. Louis, 2015

Denise E. Wilfley, Chair

Social networking website (SNW) use has been found to be associated with decreased body image or esteem and increased eating disorder (ED) symptoms. In turn, SNW use may also be associated with decreased motivation to improve body image (BI) and reduced self-efficacy in one's ability to do so. However, the impact of SNW use on motivation or self-efficacy to improve BI has not yet been studied. Also, particular moderators of the relationships between SNW and eating pathology have not yet been evaluated. This study aimed to: 1) replicate past literature by examining the relation between SNW use and eating pathology, specifically ED symptom severity, weight concerns, and ED-related clinical impairment; 2) evaluate whether depression, anxiety, and perfectionism might moderate the relations of SNW and eating pathology; and 3) examine the relation between SNW use and both motivation and self-efficacy to improve BI. Participants were 549 women, age 18-25 at varying levels of the eating disorder risk and diagnostic spectrum (i.e., from those at low risk for an eating disorder to those with clinical eating disorders) that completed self-report measures of the study constructs. Results indicated that SNW use was positively significantly associated with ED symptoms ( $p = 0.022$ ) and with weight concerns at a level that trended toward significance ( $p = 0.051$ ), but that SNW



use was not significantly associated with ED-related clinical impairment ( $p = 0.108$ ).

Perfectionism was found to significantly moderate the relationship between SNW use and ED symptoms ( $p = 0.030$ ), such that those individuals with low levels of SNW use who had low levels of perfectionism had lower levels of ED symptom severity than those with low SNW use and high perfectionism. SNW use was also positively associated with motivation to improve BI ( $p = .036$ ) but not self-efficacy to improve BI ( $p = 0.517$ ). As such, results indicate that high perfectionism is associated with greater ED symptom severity regardless of the level of SNW use endorsed by individuals, but when individuals are low on perfectionism they are found to have greater ED symptom severity only when also endorsing high levels of SNW.

## 1. Introduction

### *1.1 The Problem of Eating Disorders on College Campuses*

Population-based studies of eating disorders have estimated lifetime prevalence of anorexia nervosa, bulimia nervosa, and binge eating disorder to be 0.9%, 1.5%, and 3.0%, respectively, among women (Hudson, Hiripi, Pope, & Kessler, 2007). These disorders are associated with a host of negative consequences, such as functional impairment, substance use, impulse control problems, becoming overweight or obese, and even mortality (Field et al., 2012; Hart, Granillo, Jorm, & Paxton, 2011; Hudson et al., 2007; Keel & Brown, 2010; Stice, Marti, Shaw, & Jaconis, 2009). Indeed, anorexia nervosa has the highest mortality rate of any psychiatric illness (Hoek, 2006). Compared to the general population, rates of eating disorders (EDs) are elevated among college women. Studies have estimated that 8 to 17% of undergraduate women have a diagnosable eating disorder (Eisenberg, Nicklett, Roeder, & Kirz, 2011; Hoerr, Bokram, Lugo, Bivins, & Keast, 2002; Prouty, Protinsky, & Canady, 2002). In one study of eating disorder attitudes and behaviors, 50% of college women reported engaging in binge eating and/or compensatory behaviors at least once per week (Eisenberg, Nicklett, Roeder, & Kirz, 2011). Eating disorders and their symptoms are thus pervasive among college women and are of great public health concern.

### *1.2 The Biopsychosocial Model of Eating Disorders*

Given that eating disorders and their symptoms are common among college women and are associated with numerous negative consequences, it is important to understand relevant and possibly mutable factors that are associated with eating disorder pathology. There is general agreement in the field that the etiology of eating disorders is multifactorial and is influenced by biological, psychological, and social factors. In other words, eating disorders can be understood using a biopsychosocial framework (Connan, Campbell, Katzman, Lightman, & Treasure, 2003; Leung, Geller, & Katzman, 1996). The current study focuses on one mutable and very relevant social factor for college women, namely, social networking website (SNW) use.

### *1.3 Social Networking Website Use and Eating Disorders*

The slender body type as a beauty ideal has become especially salient in Western mass media (Garner, Garfinkel, Schwartz, & Thompson, 1980; Sypeck, Gray, & Ahrens, 2004; Wiseman, Gray, Mosimann, & Ahrens, 1992). Exposure to media messages promoting the thin ideal has been linked to body image disturbance as well as disordered eating among both women and men (Abbate Daga, Gramaglia, Piero, & Fassino, 2006; Andrist, 2003; Benowitz-Fredericks, Garcia, Massey, Vasagar, & Borzekowski, 2012; Derenne & Beresin, 2006; Field et al., 1999; Hawkins, Richards, Granley, & Stein, 2004; Hogan & Strasburger, 2008; Wright & Pritchard, 2009). However, in the past 20 years, the format of these media messages has rapidly changed. In addition to the omnipresence of more traditional media sources, like television and magazines, the Internet and millions of mobile applications on smartphones, tablet computers, laptop computers, and even on watches, now provide a new source of media messaging that is readily available. Eighty-seven percent of all American adults use the Internet, and when focusing just on young adults 18-29 years, a higher proportion – a reported 97%, use the Internet or email (Pew Research Center, 2014).

Important to note, the Internet has changed drastically in the last decade; not only are we the passive recipients of information or viewers of websites, but also we are now able to have our own Internet presence—we can post photos, personal information, opinions, and status updates on SNW profiles. Our peers can do this too, providing a new forum for social interaction and comparisons. Overall, 71% of Internet users are on Facebook, and 52% of adults use multiple social media websites. The field of psychology has begun to take notice and examine this new wave of media, SNWs; new studies are demonstrating an increase in use in recent years by children, adolescents, and adults (Lenhart, Purcell, Smith, & Zickuhr, 2010) as well as the maladaptive effects on various aspects of psychological functioning, including body image and eating behaviors (Smith et al., 2013; Tiggemann & Slater, 2013). Importantly, these comparisons are often made to our peers’ “best selves.” These representations are images that may have been altered in some way to reveal one’s most exciting experiences and most positive successes, while omitting the negative, through self-presentation (“the process of controlling how one is perceived by other people”; Leary, 1995, p. 2). Comparing oneself to another’s self-presented life

online can lead to feelings of inadequacy. Previous research has examined the tendency of an individual to engage in self-presentation online, given that it is more malleable than face-to-face presentations (Walther, 2007). For example, Smith, Hames, and Joiner (2013), as well as Tiggemann and Slater (2013), found that the tendency to make unfavorable social comparisons on Facebook was associated with increased eating disorder (ED) symptoms, and this effect was mediated by heightened body image disturbance. Of note, the behavior of social comparison, or comparing oneself to others, has been found to be pervasive among college women (Summerville & Roese, 2008), perhaps since college campuses provide a setting conducive to appearance-related social comparisons (Fitzsimmons-Craft, 2011), both in person and online.

#### *1.4 The Current Study*

Existing research on SNW use and ED pathology has utilized non-clinical convenience samples of high school and college women and has not evaluated potential moderating variables of the relationship between SNW use and eating pathology (e.g., ED symptom severity, weight concerns, ED-related clinical impairment). The presence of certain moderating variables might predispose a subgroup of college women to experience detrimental effects of using SNWs. As suggested by past research, SNW use is associated with increased weight concerns and eating disordered behaviors and attitudes (Mabe, Forney, & Keel, 2014; Smith et al., 2013; Tiggemann & Slater, 2013). As such, women with increased SNW use may feel that improving their body image is an insurmountable task, and as a result, they may experience deficits in motivation and self-efficacy when presented with treatment opportunities.

Additionally, examining these relationships in samples that include individuals at high risk for ED onset and with subclinical and clinical ED symptoms would provide the opportunity to evaluate the potential impact of SNW use on attitudes about motivation and self-efficacy related to treatment for weight concerns. The current study addresses these limitations of past work by examining, in a sample of individuals who range from low risk of onset of ED to those individuals diagnosed with eating disorders:

- 1) the relationships between SNW use and facets of eating pathology (i.e., ED symptom severity, weight concerns, ED-related clinical impairment);
- 2) potential moderators of these relationships; and
- 3) the

relationships between SNW use and motivation and self-efficacy to improve body image in a sample of college women.

### *1.5 Potential Moderators*

Returning to the biopsychosocial model, there are many psychological factors thought to impact disordered eating, and it may be that certain psychological variables interact with SNW use to strengthen its influence on eating pathology. In the current study, we examine the potential influence of three psychological variables in particular: depression, anxiety, and perfectionism.

#### *1.5.1 Depression*

The co-occurrence of mood disorders, especially depression, and eating disorders has been frequently reported (Fernandez-Aranda et al., 2007; Gadalla & Piran, 2008; Hudson et al., 2007; Liechty & Lee, 2013; Mischoulon et al., 2011). Symptoms of major depression disorder include depressed mood and feelings of worthlessness, often causing impairment in important areas of functioning, including social aspects of an individual's life like SNW use. Given this frequent comorbidity, individuals experiencing depression as well as symptoms of eating disorders may be more apt to make negative comparisons between themselves and peers on SNW, perhaps exacerbating these proposed relations between SNW use and ED symptom severity, weight concerns, and clinical impairment.

#### *1.5.2 Trait Anxiety*

Anxiety also often co-occurs with eating disorders (Christopher G. Fairburn & Harrison, 2003; Hudson et al., 2007), and women with eating disorders have been cited as having anxiety at higher rates than normal controls (Pallister & Waller, 2008; Swinbourne et al., 2012). The same difficulty that comes with everyday functioning for anxious individuals is an expected to overflow in SNW interactions. SNWs are yet another setting for the numerous behaviors and exchanges between anxious individuals and their peers or acquaintances. In the same manner that anxiety may exacerbate ED symptoms and related constructs, anxiety may also exacerbate the proposed relations between SNW use and ED symptom severity, weight concerns, and clinical impairment.

#### *1.5.3 Perfectionism*

Perfectionism is the belief that an individual must strive to be perfect. This drive can be easily applied to eating, weight, and shape and may make an individual's perceived shortcomings, such as not fitting the thin ideal, traumatic. Indeed, perfectionism has been found to be associated with numerous psychological disorders, including eating disorders (Bastiani, Rao, Weltzin, & Kaye, 1995; Lilenfeld et al., 2000). Perfectionism has been found to be elevated most consistently in individuals with anorexia nervosa (AN) but also in those with bulimia nervosa (BN) as compared to normal controls. The findings regarding perfectionism and the third major category of EDs, binge eating disorder (BED), have been found to be inconsistent at best (Bardone-Cone et al., 2007). Also, perfectionism has been found to return to levels similar to healthy controls when individuals are fully recovered from their eating disorder (physically, behaviorally, and psychologically) (Bardone-Cone et al., 2010). Given the consistent finding of clear associations between EDs and perfectionism, as compared to mixed associations between perfectionism and mood and anxiety disorders (Bardone-Cone et al., 2010), it may be especially useful to determine perfectionism's specific role in any relationships concerning EDs. Individuals who are high in perfectionism may engage in even more disordered behaviors online than those who are low in perfectionism, exhibiting greater ED symptom severity in their drive to attain this ideal.

#### *1.6 The Importance of Motivation and Self-Efficacy to Improve Body Image*

Although the impact of adding motivation modules to eating disorder interventions has produced mixed findings (Waller, 2012), Clausen et al (2013) found that pretreatment level of motivation to change eating behavior was indeed associated with treatment outcome. Therefore, pretreatment motivation may be an important predictor of treatment prognosis. As such, it may also be important to understand correlates of motivation and self-efficacy to improve body image, such as SNW use. However, prior research has not examined the unique impact of social networking use on motivation or self-efficacy to improve body image. Examining these relationships in our sample including individuals at-risk or with a clinical diagnosis provides the opportunity to evaluate the potential impact of SNW use on motivation and self-efficacy to improve BI.

#### *1.7 Eating Disorder-Related Clinical Impairment*

When considering psychopathology and the biopsychosocial model, as discussed earlier, it is also important to consider the impact of relevant constructs on psychosocial and physical functioning. For example, EDs can impact an individual's cognitive functioning (e.g., memory, ability to make everyday decisions), school or work performance, and ability to form intimate relationships, among other things (Bohn et al., 2008; Mond, Hay, Rodgers, & Owen, 2012). This widespread impact can be defined as clinical impairment. It is often thought that clinical impairment drives many individuals to seek treatment (Bohn et al., 2008) but also that a treatment's main objective should be to decrease this impairment. Therefore, it is important to evaluate if the potentially maladaptive behavior of SNW use may increase this impairment, and if so, a decrease or change in SNW use may be considered a worthwhile treatment target.

### *1.8 Study Aims and Hypotheses*

Thus, the primary aim of this proposed study is to replicate and expand upon the previous literature by: (1) examining the relations between social networking use and ED symptom severity, weight concerns, and eating disorder-related clinical impairment; (2) examining potential moderating variables of these relationships, including depressive symptoms, trait anxiety, and perfectionism; and (3) examining the relationship between social networking use and both motivation and self-efficacy to improve one's body image in a sample of women including those at high-risk for the onset of an eating disorder and those with subclinical and clinical eating disorders. We hypothesize that: (1) SNW use will be positively associated with ED symptom severity, weight concerns, and ED-related clinical impairment; (2) the moderators of depression, anxiety, and perfectionism will strengthen the relations between SNW use and the facets of eating pathology; and (3) SNW use will be negatively associated with motivation and self-efficacy to improve body image.

## **2. Method**

### *2.1 Participants*

Participants were 549 women aged 18-25 years. The majority of participants were enrolled at universities in the Saint Louis, Sacramento, and San Francisco Bay areas. Women were identified as meeting criteria for one of three possible ED risk categories: clinical or subclinical ED ( $n = 107$ ), high risk for ED onset ( $n = 346$ ), or low risk for ED onset ( $n = 96$ ). The ED category included women who met *DSM-5* (American Psychiatric Association, 2013) criteria for a clinical (i.e., anorexia nervosa, bulimia nervosa, binge eating disorder, other specified feeding or eating disorder) or subclinical ED based on data from the Eating Disorder Examination 14.0 (EDE 14.0) (C. Fairburn & Cooper, 1993). Women were considered at high risk for ED onset if they self-reported elevated concerns about weight and shape, defined as scoring a 47 or higher on the Weight Concerns Scale (WCS) (Killen et al., 1996; Killen et al., 1994) or endorsed the statement(s), “My weight is more important than most, but not all, things in my life,” “My weight is the most important thing in my life,” “I am very afraid of gaining three pounds,” or “I am terrified of gaining three pounds” on the WCS, irrespective of total score (Jacobi, Abascal, & Taylor, 2004). Women were considered at low risk for ED onset if they did not meet criteria for either a clinical or subclinical ED or high-risk status. Women were excluded if they were actively suicidal, suffering from a severe psychiatric disorder (e.g., bipolar disorder, psychosis), did not have regular Internet access, or resided outside the metropolitan regions of the university sites. Women who reported current prescription medication for mood or anxiety disorders were included if their medication was stable for at least 2 weeks.

## *2.2 Procedures*

Study participants were recruited using study fliers posted at local academic institutions, on Facebook.com, on Craigslist.com, via campus email solicitations from study staff and campus leaders, and through a recruitment organization called Volunteers for Health (only at Washington University in St. Louis). Recruitment materials targeted women who were concerned about their weight, wanting to feel better about their body, experiencing interpersonal problems, and/or having difficulty focusing on their schoolwork. Potential participants completed a brief screening questionnaire that assessed for inclusion



criteria through email or over the phone, and women identified as potentially meeting study inclusion criteria were invited for an in-person assessment. To confirm study eligibility, trained assessors measured participants' height (cm) and weight (kg) in triplicate and conducted two semi-structured diagnostic interviews to determine the presence of ED symptoms and psychiatric comorbidity: the EDE (C. Fairburn & Cooper, 1993) and the Structured Clinical Interview for DSM-IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 2002). Those women deemed eligible completed additional self-report questionnaires. The institutional review board at each of the participating sites approved the study protocol, and all participants provided informed consent.

### *2.3 Measures*

#### *2.3.1 Socio-Demographic Characteristics*

A self-report measure was used to assess participant demographic characteristics. These included: age (years), racial/ethnic background (i.e., non-Hispanic White, African/African American, Asian/Asian American, Hispanic/Latino/Mexican American, multi-ethnic, other), and education status of the participant's most educated parent / caregiver (i.e., less than high school, high school graduate, college graduate, graduate degree) as proxy for socio-economic status.

#### *2.3.2 Social Networking Website (SNW) Use*

Participants' use of social networking websites was assessed with the self-report item, "How many hours a day do you spend using social networking websites on the Internet? (e.g., Facebook, Twitter, etc.)." This item was rated on the following scale: 0 (*Zero hours*), 1 (*Less than one hour*), 2 (*One hour*), 3 (*Two hours*), 4 (*3+ hours*). It should be noted that this author-created item is similar to other studies' methods of assessing SNW use (Bair, Kelly, Serdar, & Mazzeo, 2012; Chou & Edge, 2012; Stefanone, Lackaff, & Rosen, 2011; Tiggemann & Slater, 2013).

#### *2.3.3 Depression*

*Beck Depression Inventory-II (BDI-II)*. The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item, self-report questionnaire that assesses depressive symptoms over the previous 2 weeks. Items are rated on a scale ranging from 0-3, and items are summed to create total score, with higher scores indicating more severe depressive symptoms. The BDI-II is a widely used measure of depressive symptoms in clinical and community samples and has demonstrated high internal consistency (Cronbach's  $\alpha = 0.90$ ) in a college sample (Storch, Roberti, & Roth, 2004). The BDI-II has been also found to be significantly correlated with measures of anxiety ( $r_s = 0.76$  and  $0.69$ ,  $p < 0.001$ ), providing evidence of its construct validity (Storch et al., 2004). In the current study, alpha was 0.92.

#### 2.3.4 Anxiety

*Spielberger State-Trait Anxiety Inventory (STAI)*. The STAI (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) consists of two, 20-item self-report scales (40 items total) for measuring anxiety as an emotional state (state anxiety) and anxiety proneness as a personality trait (trait anxiety); only the trait anxiety subscale was used in the current analyses. The trait anxiety subscale assesses frequency of anxiety-related feelings "in general," and all item responses are rated on a 4-point scale ranging from 1 (*Almost Never*) to 4 (*Almost Always*). Items are summed to create a trait anxiety subscale score, with higher scores indicating greater trait anxiety. The trait anxiety subscale has demonstrated good internal consistency (Cronbach's  $\alpha = 0.92$ ; Ramanaiah, Franzen, & Schill, 1983), as well as good 21-day test-retest reliability (ICC = 0.97; Metzger, 1976) in samples of college students. The trait anxiety subscale correlates highly with measures of negative affectivity (Watson & Clark, 1984) and differentiates between individuals with and without anxiety disorders (Taylor, Koch, & McNally, 1992), providing evidence of its construct validity. In the current study, alpha was 0.93.

#### 2.3.5 Perfectionism

*Eating Disorder Inventory – Perfectionism Subscale (EDI-P)*. The EDI-P subscale (Garner, 1991) consists of 6 items measuring excessive personal expectations of achievement. Each item is rated on a 6-

point Likert-like scale, ranging from 1 (*Never*) to 6 (*Always*). Items are averaged to create a subscale score, with higher scores indicating greater perfectionism. The EDI-P subscale has been found to demonstrate acceptable internal consistency, with past research indicating an alpha of 0.80 in a female sample (Eberenz & Gleaves, 1994). The EDI-P subscale demonstrates acceptable reliability (Cronbach's alpha = 0.79; Garner, Olmstead, & Polivy, 1983) and adequate convergent validity ( $r = 0.39$ ; Garner et al., 1983) with regards to symptom checklist and screening assessments (e.g., Hopkins Symptom Checklist). In the current study, alpha was 0.85 for the perfectionism subscale.

#### *2.3.6 ED Symptom Severity*

*Eating Disorder Examination – Questionnaire (EDE-Q), Global Score.* The EDE-Q (C. G. Fairburn & Beglin, 1994) is a 39-item, self-report version of the EDE used to assess eating ED psychopathology in the last 28 days. The questionnaire yields four subscale scores (i.e., Restraint, Eating Concern, Weight Concern, Shape Concern) and a global score is calculated by averaging the subscale scores. Higher global scores are indicative of higher ED psychopathology (C. G. Fairburn & Beglin, 1994). All items were rated on a 7-point scale, ranging from 0 (*Not At All*) to 6 (*Markedly*). The EDE-Q global has demonstrated good internal consistency (Cronbach's alpha ranging from 0.91 to 0.92) and good one-week test-retest reliability (Spearman's rho = 0.90) in college-age women (Rose, Vaewsorn, Rosselli-Navarra, Wilson, & Striegel Weissman, 2013). The EDE-Q global has been found to be highly correlated with measures of body dissatisfaction and other measures of eating pathology in college women (Grilo, Masheb, & Wilson, 2001), providing evidence of its construct validity. In the current study, alpha was 0.93 for the global score.

#### *2.3.7 Weight Concerns*

*Weight Concerns Scale (WCS).* The WCS (Killen et al., 1994) is a 5-item, self-report questionnaire that measures weight and shape concerns, fear of weight gain, dieting frequency, importance of weight, and feelings of fatness. Items are rated on a 5-point scale (1 to 5) with different, relevant anchors used for

each item. For the majority of items, one is subtracted from each question response, then multiplied by 100, and then divided by 4 (for questions 3 and 4, they are divided by 6 and 3, respectively). The resulting item scores are averaged, with possible scores ranging from 0–100 and higher scores indicating greater weight concerns. As previously mentioned, scores of 47 and above are associated with an increased risk of developing an ED (Killen et al., 1996; Killen et al., 1994). The WCS was shown to have excellent test-retest reliability over a 7-month interval ( $r = 0.71$ ; Killen et al., 1994). In addition, the WCS is significantly correlated with measures of body dissatisfaction and general eating pathology ( $r_s = 0.43$  to  $0.72$ ), providing evidence of its construct validity (Jacobi et al., 2004; Killen et al., 1994). In the current study, alpha was 0.76.

### *2.3.8 ED-Related Clinical Impairment*

*Clinical Impairment Assessment 3.0 (CIA)*. The CIA (Bohn et al., 2008; Bohn & Fairburn, 2008) is a 16-item, self-report questionnaire that measures psychosocial impairment specifically due to ED features in the past 28 days across multiple domains (i.e., mood and self-perception, cognitive functioning, interpersonal functioning, work performance). Items are rated on a 4-point scale, ranging from 0 (*Not at all*) to 3 (*A lot*). Items are summed to create a global score, with higher scores indicating greater ED-related clinical impairment. The CIA has demonstrated excellent internal consistency (Cronbach's alphas ranging from 0.91 to 0.94; Becker et al., 2010; Reas, Ro, Kapstad, & Lask, 2010) and three-day test-retest reliability (ICC = 0.86; Bohn et al., 2008). The CIA's significant positive correlation with a measure of global eating pathology (Spearman rho = 0.79,  $p < 0.001$ ) provides evidence for its construct validity (Reas et al., 2010). In the current study, alpha was 0.95.

### *2.3.9 Motivation to Improve Body Image*

Motivation to improve body image was assessed using four items created for the current study. These items were: “How motivated are you to improve your body image?”, “How much time are you willing to put into improving your body image? (Hours per week)”, “How much effort are you willing to

put into improving your body image (e.g., doing things like reading and reflecting on material, trying exercises, expressing your thoughts with others)?”, and “How willing are you to try new behaviors that may feel awkward at first to improve your body image?” When “Hours per week” were requested, items were rated on the following scale: 0 (*Zero hours*), 1 (*Less than one hour*), 2 (*One hour*), 3 (*Two hours*), and 4 (*3+ hours*). All other items were rated on the following scale 5-point scale: 0 (*Not at all*), 1 (*A little*), 2 (*Some*), 3 (*A fair amount*) and 4 (*Very much*). The four items were averaged to create a measure score. To the author’s knowledge, no psychometrically validated assessments exist to measure an individual’s motivation to improve body image; consequently, items were created to by the researchers. In the current study, alpha was 0.78.

#### *2.3.10 Self-Efficacy to Improve Body Image*

Self-efficacy was measured using one item created for the current study: “How confident are you that you will be able to improve your body image?”. This item was rated on the following 5-point scale: 0 (*Not at all*), 1 (*A little*), 2 (*Some*), 3 (*A fair amount*) and 4 (*Very much*). To the author’s knowledge, no other psychometrically validated assessments exist to measure self-efficacy to improve body image; consequently, this item was created by the researchers.

#### *2.4 Analytic Plan*

Regression analyses were conducted to examine the relations between SNW and ED symptom severity, SNW and weight concerns, and SNW and ED-related clinical impairment. Hierarchical multiple regression was utilized to test the hypothesized moderator models in the relationships between SNW use and eating pathology (EDE-Q, WCS, and CIA). To clarify, each potential moderator (depression, anxiety, and perfectionism) was evaluated in each relationship of SNW use and eating pathology (EDE-Q, WCS, and CIA), totaling nine hierarchical multiple regressions. In Step 1 of each hierarchical multiple regression, SNW use and the moderator of interest (i.e., depression, perfectionism, or anxiety) were entered as main effects. In Step 2, the two-way interaction of SNW use and the moderator (i.e.,

depression, perfectionism, or anxiety) was entered. Interaction terms were created by multiplying together the centered SNW use variable and the centered moderator as recommended by Frazier, Tix, and Barron (2004). The nature of the significant interactions was assessed via simple slope analyses (Aiken & West, 1991). Regression models were also utilized to examine the relationship between SNW and motivation to improve BI and SNW and self-efficacy to improve BI.

### 3. Results

#### *3.1. Descriptive Statistics*

Participants ranged in age from 18 to 25 years ( $M=20.61$  years,  $SD=1.97$ ), with most identifying themselves as Caucasian (55.6%), 21.5% as Asian, 8.7% as African-American/Black, 8.4% Hispanic, 3.3% as multi-ethnic, and 2.6% as other. In terms of socio-economic status, participants' highest levels of parental education ranged from "Less than High School" to "Graduate Degree," with a majority reporting the highest level of education for their most educated caregiver as a graduate degree (46.1%), 2.7% as some graduate school, 22.0% as college graduate, 22.6% as some college, 4.4% as high school graduate, 2.0% as less than high school, and 0.2% did not know.

Means and standard deviations for the study variables and their correlations are presented in Table 1. It is important to note, as SNW use is the focus of this study, that the mean for SNW use in this sample was 2.16. This translates to participants in our sample spending an average of 1-2 hours specifically on social networking websites (e.g., Facebook, Twitter) per day.

#### *3.2 Relations Between SNW Use and Eating Pathology*

SNW use was significantly positively associated with ED symptom severity (EDE-Q) ( $\beta = 0.10$ ,  $t(545) = 2.30$ ,  $p = 0.022$ ), and was positively associated with weight concerns (WCS) at a level that approached significance ( $\beta = 0.08$ ,  $t(545) = 1.96$ ,  $p = 0.051$ ). SNW use and clinical impairment (CIA) were not found to be significantly related in this sample ( $\beta = 0.07$ ,  $t(543) = 1.61$ ,  $p = 0.108$ ).

#### *3.3 Moderation in the Relations Between SNW Use and Eating Pathology*

Altogether, nine hierarchical multiple regressions were performed involving the interaction of SNW use and potential moderators (i.e., depression, perfectionism, and anxiety) in the prediction of ED symptom severity, weight concerns, and ED-related clinical impairment, the results of which are displayed in Tables 2-4.

### *3.3.1 Moderators of the SNW Use and ED Symptoms Relationship*

As detailed in Table 2, neither depression ( $p = 0.075$ ) nor anxiety ( $p = 0.171$ ) was found to be a significant moderator of the relationship between SNW use and ED symptom severity. However, perfectionism was found to significantly moderate the relationship between SNW use and ED symptom severity ( $p = 0.030$ ). As depicted in Figure 1, those with low levels of SNW use who had low levels of perfectionism had lower levels of ED symptom severity than those with low SNW use and high perfectionism (high and low levels of the predictors were determined by one standard deviation above and below the mean, respectively). Those with high levels of perfectionism had high ED symptom severity regardless of their SNW use. Simple slope analyses were utilized to further examine this relationship and indicated that SNW use was significantly associated with disordered eating at low levels of perfectionism (1 SD below the mean),  $\beta = 0.24$ ,  $t(540) = 3.46$ ,  $p < 0.01$ , but not at high levels of perfectionism (1 SD above the mean),  $\beta = 0.12$ ,  $t(540) = 1.94$ ,  $p = 0.53$ .

### *3.3.2 Moderators of the SNW Use and Weight Concerns Relationship*

The three hierarchical multiple regressions testing the interaction of SNW use and potential moderators (depression, anxiety, perfectionism) in the prediction of WCS were not significant ( $ps > 0.098$ ) (see Table 3).

### *3.3.3 Moderators of the SNW and Eating Disorder Related Clinical Impairment Relationship*

The three hierarchical multiple regressions testing the interaction of SNW use and potential moderators (depression, anxiety, perfectionism) in the prediction of CIA were not significant ( $ps > 0.171$ ) (see Table 4).

## *3.4 Motivation and Self-Efficacy to Improve Body Image*

Counter to the prediction of an inverse relationship, SNW use was significantly positively associated with motivation to improve BI ( $\beta = 0.09$ ,  $t(544) = 2.10$ ,  $p = 0.036$ ). SNW use was not significantly associated with self-efficacy to improve BI ( $\beta = 0.03$ ,  $t(545) = 0.65$ ,  $p = 0.517$ ).

#### 4. Discussion

This study replicated previous findings of a positive relationship between SNW use and ED symptom severity found in convenience samples (e.g., unselected sample of college women; Bair et al., 2013). Our results extend previous findings and indicate that this relationship remains consistent in a sample of college women including those at high risk for onset of EDs and with subclinical or clinical diagnoses of EDs. In the current study, the positive relationship between SNW use and weight concerns trended toward the significance. Previous studies have found support for this relationship (e.g., Mabe et al., 2014), including an experimental study that compared the decrease in weight concerns after general Internet use and the SNW of Facebook. Finally, the relationship between SNW and eating disorder-related clinical impairment was not found to be significant, which may be due to the inclusion of low-risk individuals in the study sample.

Beyond replication of previous findings regarding the positive association between SNW use and ED symptom severity, the current study demonstrated perfectionism as a moderator of the relationship between SNW use and ED severity. Perfectionism was hypothesized to strengthen the relationship between SNW use and ED symptom severity; however, perfectionism was found to moderate the relationship in a different manner. Specifically, those individuals with low levels of SNW use who had low levels of perfectionism were found to have lower levels of ED symptom severity than those individuals with low SNW use and high perfectionism. Those individuals with high levels of perfectionism had high ED symptoms severity regardless of their SNW use. This interaction suggests that perfectionism is associated with ED symptom severity regardless of the level of SNW use endorsed by individuals, but when individuals are low on perfectionism, high levels of SNW use are associated with greater ED symptom severity. Conversely, those who are low on perfectionism and showed low levels



of SNW use were associated with lower levels of ED symptom severity, exhibiting favorable psychological health.

Notably the other eight moderation analyses run during this study did not yield significant results. As stated earlier, each potential moderator (depression, anxiety, and perfectionism) was evaluated in each relationship of SNW use and eating pathology (EDE-Q, WCS, and CIA), totaling nine hierarchical multiple regressions. Perhaps the potential moderators of depression and anxiety did not yield significant results in relations that include social online behavior (including SNW use), given that previous research found associations between Internet use and depression and anxiety to be spurious at best (Caplan, 2006). Since initial reports in the late 1990s that reported Internet use would produce detrimental effects, including stress, loneliness and depression, researchers have found that these hypothesis were not supported (Jelenchick, Eickhoff, & Moreno, 2013; Shaw & Gant, 2002), perhaps the moderation results for depression and anxiety reflect this non-relationship.

Contrary to hypotheses, SNW use and motivation to improve body image were *positively* significantly related. There may be several explanations for this finding. Most likely, the individuals in our sample may have misunderstood what was meant by “motivation to improve body image.” Many individuals may assume that a more positive body image is the result of changing their body to achieve a more ideal look, but an improvement in body image is the result of mindset and perspective, not necessarily the actual weight and shape of their body. Interestingly, no relationship was found between SNW use and self-efficacy to improve body image, for which there may be several explanations. For example, self-efficacy may be related to certain types of behaviors included in SNW use and not others. Also only one item attempted to capture the individual’s self-efficacy to improve their body image, so perhaps a more extensive measurement of this construct would provide greater information and detail toward understanding how self-efficacy and SNW use relate.

#### *4.1 Clinical Implications*

Given that SNW use was significantly associated with ED symptom severity and associated with weight concerns at a level that approached significance, these findings may have important clinical

implications for the prevention and treatment of eating pathology and weight concerns. Further research must be done to identify maladaptive SNW use behaviors, but once identified, interventionists could perhaps generate and evaluate how specific changes to an individual's online behavior could alter negative outcomes. For example, interventionists could examine how social comparison plays out on *Facebook*, or on picture sharing apps such as *Instagram*, and develop tailored media literacy programs for adolescents and young adults to follow during a prevention program or through psychoeducation in the early stages of treatment.

The moderation findings of this study suggest that perfectionism may exist as an especially important negative influence on ED symptom severity, given that individuals high in perfectionism exhibited increased ED symptom severity regardless of their SNW use. However, those individuals low on perfectionism did not exhibit increased ED symptom severity, except when SNW use was also increased, which demonstrates the importance of addressing SNW use. Clinicians could interpret these finding as suggesting perfectionism as an important target in treatment, and in cases where clients are low on perfectionism, SNW is another possibly important target in the treatment of eating disorders. Clinicians should account for the increased use of SNWs in college-age women's social lives and SNW's potential negative consequences, and they should evaluate use of these websites with clients who exhibit ED pathology and as well as any level of perfectionism.

#### *4.2 Strengths and Limitations*

One particular strength of this study is the focus on women ages 18-25 years, a group at very high risk for eating disorders. Another strength is the fact that the study sample included women across the eating disorder risk and diagnostic spectrum, meaning those ranging from low risk to those diagnosed with a disorder, thereby allowing for the measurement of the relations along the continuum of disordered eating behaviors that exist in the population, not only a community sample or clinical sample. This study also has a number of limitations. This sample includes women exclusively from the San Francisco Bay, Sacramento, and St. Louis metropolitan areas. The items used to assess motivation and self-efficacy to improve body image were created by the study authors. Furthermore, each of the motivation and self-

efficacy variables consists of very few items, four and one respectively, which may not capture either construct entirely. An additional limitation is the cross-sectional nature of this study; therefore, causal relationships could not be determined. Also all variables were measured via self-report.

#### *4.3 Future Directions*

##### *4.3.1 Prospective Longitudinal Research*

Prospective longitudinal research (e.g., traditional time point assessments or perhaps ecological momentary assessment), as well as additional experimental research a la Mabe et al. (2014), should be conducted to determine if SNW use is a risk factor for developing ED behaviors or if ED behaviors predict increased SNW use. For example, Mabe, Forney, and Keel (2014) utilized an experimental design to examine whether Facebook use caused temporal changes in eating disorder risk factors. The authors' experimental design indicated that typical Facebook use may contribute to maintenance of weight/shape concerns and state anxiety, both of which are established eating disorder risk factors; however, the magnitude of that impact can only be simulated, given this design included 20 minutes of Facebook use, and we know that young adults' use of SNWs is more frequent and lengthy. On a related note, an experimental or longitudinal design may also be used to address the degree to which SNW negatively impacts individuals high or low on perfectionism. Tracking these naturally occurring groups in a longitudinal model and comparing the differences of their ED symptoms could assist in answering the question of how truly "bad" SNW use is in the population of women.

Longitudinal research may also be useful when considering whether maladaptive SNW behavior precedes perfectionism or vice versa. As mentioned earlier, research has found that perfectionism remains at elevated levels in individuals who have recovered from EDs (in weight and behavioral criteria), suggesting that perfectionism may precede EDs as a risk factor (Bardone-Cone et al., 2010; Bardone-Cone et al., 2007). However, additional prospective longitudinal research is necessary to test this theory. If multiple patterns of risk factors are found to exist within the evaluated population, grouping individuals by their patterns or longitudinal model may yield interesting and useful information regarding the

differences in these individuals and their possible associated disordered eating behaviors. For example, perhaps individuals with EDs, in whom SNW use precedes increased levels of perfectionism, may be found easier to treat given that maladaptive SNW use behaviors are derived as the cause of perfectionistic traits versus those individual whom have high perfectionistic traits prior to exposure to SNW use.

#### *4.3.2 Measurement*

In a similar vein of evaluating perfectionism more closely, particular attention must be paid to measurement in all relationships between SNW use and eating pathology. In this study perfectionism was measured utilizing the EDI-P, which yields one score and is said to measure general perfectionism, yet contains numerous items that researchers have found load onto two different factors of perfectionism (Bardone-Cone et al., 2007; Joiner Jr & Schmidt, 1995; Sherry, Hewitt, Besser, McGee, & Flett, 2004): adaptive and maladaptive perfectionism. Data indicate that the construct of perfectionism is better reflected by a two-factor model of perfectionism (Bardone-Cone et al., 2007; Davis, 1997), most often described as maladaptive perfectionism and adaptive (aka positive striving or achievement striving) perfectionism (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Frost and colleagues (Frost et al., 1993) described maladaptive [evaluative concern] factor of perfectionism as concern over mistakes, parental criticism, parental expectations, doubts about actions and socially-prescribed perfectionism, as compared to the positive striving factor, which includes personal standards, organization, self-oriented perfectionism, and other oriented perfectionism. Therefore, in moving forward with this line of research, perfectionism would be best captured using this two-factor model, and perhaps each factor may differ in their association with SNW behaviors and ED symptoms. For example, Bieling, Israeli, and Antony (2004) found the maladaptive evaluative concerns factor of perfectionism to be more strongly associated with psychological distress than the adaptive factor. Perhaps this factor could be specifically evaluated for its possible associations with SNW behaviors and psychological ED symptoms in longitudinal research.

This study also did not directly assess the nature of SNW use. SNW use could be parsed apart beyond recording the time spent engaging in SNW use, with additional study of the types of behaviors that occur in SNW use. For example, the behaviors of reading the news or sharing recipes with friends

would most likely impact the individual differently than, say, spending time on SNWs looking at friends' profiles or looking at profiles of celebrities or other aspirational figures' lifestyles and images.

Determining a proper way to group behaviors and then examining which types of behaviors are most associated with perfectionism and ED symptoms may be worthwhile in this line of research.

Although this study adapted questions often used in the field to measure motivation surrounding ED treatment, moving forward, utilization/adaptation of one or more of the few questionnaires whose psychometrics have been evaluated and validated after our data collections period (Clausen, Lubeck, & Jones, 2013) may improve our understanding of how SNW behaviors impact certain features of motivation to change or improve body image. As noted above (limitations) numerous challenges exist in the field surrounding measuring motivation to change, especially for eating disorders. Some limitations include but are not limited to: a lack of operationalized definitions of the stages of change, non-discrete stages,, and the remaining gap between theoretical models of change and the ability of researchers and clinicians to further understand and influence how much an individual's motivation can change ; Wilson and Schlam (Terence Wilson & Schlam, 2004; Vitousek, Watson, & Wilson, 1998) attribute these problems to deficiencies on the part of the models (e.g., the transtheoretical stages of change model).

#### *4.4 Conclusion*

In conclusion, the relationships between SNW use and ED symptom severity, weight concerns, and ED-related clinical impairment in a sample of college-age women were measured and evaluated. This study adds to the literature by providing evidence that the relationship between SNW use and ED symptom severity and SNW use and weight concerns, at the trend level, hold when studied in a sample of individuals that range from low risk for EDs and with individuals diagnosed with a ED. Also, potential moderating variables of the relations between SNW use and eating pathology were examined for the first time in a sample including women at high risk and at the subclinical and clinical levels of ED symptoms, with results indicating that perfectionism was a significant moderator of the SNW use – ED symptom severity relation. SNW use was associated with increased motivation to improve BI as well. As such, women who use SNWs may be particularly amenable to and may benefit from prevention or intervention,

given that increased motivation is associated with improved intervention adherence and outcomes. SNW use behaviors should also be examined further in high-risk populations, employing more comprehensive, empirically validated assessment tools for measuring these variables, when they become available in the field. As technology and media continue to advance, more research will be needed to evaluate the new influences and activities that may increase risk for, or maintenance of eating disorders.

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Table 1

*Correlations Among and Means and Standard Deviations of the Measured Variables (N = 549)*

	1	2	3	4	5	6	7	8	9	Mean (SD)	Assessment Score Range
1. SNW	-									2.16 (1.11)	0 – 4
2. EDE-Q, global	.10*	-								2.15 (1.11)	0 – 6
3. WCS	.08	.81***	-							54.09 (20.42)	0 – 100
4. CIA	.07	.78***	.65***	-						10.98 (9.56)	0 – 48
5. BDI-II, total	.11*	.53***	.42***	.62***	-					10.00 (8.91)	0 – 63
6. EDI-P	.08	.21***	.20***	.19***	.223***	-				4.11 (1.13)	0 – 18
7. STAI-Trait	.10*	.48***	.42**	.56***	.72***	.21**	-			42.04 (11.48)	20 – 80
8. Motivation	.09*	.37***	.45**	.29***	.08	.05	.12**	-		2.86 (0.77)	0 – 4
9. Self-Efficacy	.03	-.19***	-.15***	-.20***	-.31***	-.05	-.32***	.27***	-	2.33 (1.06)	0 – 4

*Note.* SNW = Social Networking Website Use. EDE-Q = Eating Disorder Examination Questionnaire; WCS = Weight Concerns Scale; CIA = Clinical Impairment Assessment; BDI-II = Beck Depression Inventory – II; EDI-P = Eating Disorder Inventory – Perfectionism Subscale; STAI-Trait = Spielberger State-Trait Anxiety Inventory, Trait Anxiety Scale (STAI-Trait); Motivation = Motivation to Improve Body Image scale.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 2

*Hierarchical Multiple Regression Analyses of the Interaction of Hours of Social Networking Website Use and Moderators (Depression, Anxiety, Perfectionism) in the Prediction of Eating Disorder Symptom Severity (EDE-Q)*

Step and predictors	B	SE B	$\beta$	$t (dfs)$	$p$	$\Delta R^2$
Step 1						.28***
Hours of SNW	.04	.04	.04	1.08 (2,499)	.281	
Depression	.06	.01	.52	13.55(2,499)	.000	
Step 2						.01
Hours of SNW x Depression	-.01	.004	-.07	-1.78 (1,498)	.075	
Step 1						.24***
Hours of SNW	.05	.04	.05	1.38 (2,498)	.168	
Trait Anxiety	.05	.004	.48	12.14 (2,498)	<.001	
Step 2						.003
Hours of SNW x Trait Anxiety	-.01	.003	-.05	-1.37 (1,497)	.171	
Step 1						.05***
Hours of SNW	.09	.04	.09	2.10 (2,543)	.037	
Perfectionism	.20	.04	.20	4.86 (2,543)	<.001	
Step 2						.01*
Hours of SNW x Perfectionism	-.08	.04	-.09	-2.17 (1,542)	.030	

*Note.* SNW = Social Networking Website Use.

\* $p < .05$ . \*\* $p < .001$ .

Table 3

*Hierarchical Multiple Regression Analyses of the Interaction of Hours of Social Networking Website Use and Moderators (Depression, Anxiety, Perfectionism) in the Prediction of Weight Concerns (WCS)*

Step and predictors	B	SE B	$\beta$	$t$ (dfs)	$p$	$\Delta R^2$
Step 1						.18***
Hours of SNW	.83	.72	.05	1.15 (2,499)	.250	
Depression	.92	.09	.42	10.26 (2,499)	.001	
Step 2						.004
Hours of SNW x Depression	-.13	.08	-.07	-1.66 (1,498)	.099	
Step 1						.18***
Hours of SNW	.88	.71	.05	1.24 (2,498)	.217	
Trait Anxiety	.71	.07	.42	10.21 (2,498)	.001	
Step 2						.002
Hours of SNW x Trait Anxiety	-.07	.06	-.05	-1.12 (1,497)	.262	
Step 1						.05***
Hours of SNW	1.33	.77	.07	1.72 (2,543)	.086	
Perfectionism	3.50	.76	.19	4.61 (2,543)	.001	
Step 2						.004
Hours of SNW x Perfectionism	-1.07	.70	-.07	-1.54 (1,542)	.125	

*Note.* SNW = Social Networking Website Use.

\*\*\* $p < .001$

Table 4

*Hierarchical Multiple Regression Analyses of the Interaction of Hours of Social Networking Website Use and Moderators (Depression, Anxiety, Perfectionism) in the Prediction of Level of Eating Disorder-Related Clinical Impairment (CIA)*

Step and predictors	B	SE B	$\beta$	$t$ (dfs)	$p$	$\Delta R^2$
Step 1						.39***
Hours of SNW	.11	.31	.01	.36 (2,498)	.720	
Depression	.67	.04	.62	17.49 (2,498)	<.001	
Step 2						.001
Hours of SNW x Depression	.03	.03	.03	.81 (1,497)	.416	
Step 1						.040***
Hours of SNW	.50	.36	.06	1.37 (2,541)	.172	
Perfectionism	1.57	.36	.19	4.40 (2,541)	.000	
Step 2						.003
Hours of SNW x Perfectionism	-.45	.33	-.06	-1.37 (1,540)	.172	
Step 1						.31***
Hours of SNW	.22	.32	.03	.70 (2,496)	.504	
Trait Anxiety	.47	.03	.56	14.93 (2,496)	<.001	
Step 2						.000
Hours of SNW x Trait Anxiety	.01	.03	.01	.22 (1,495)	.823	

*Note.* SNW = Social Networking Website Use.

\*\*\*  $p < .001$ .



Figure 1. Two-way interaction involving perfectionism moderating the relation between social networking and eating disorder symptom severity (EDE-Q scores).

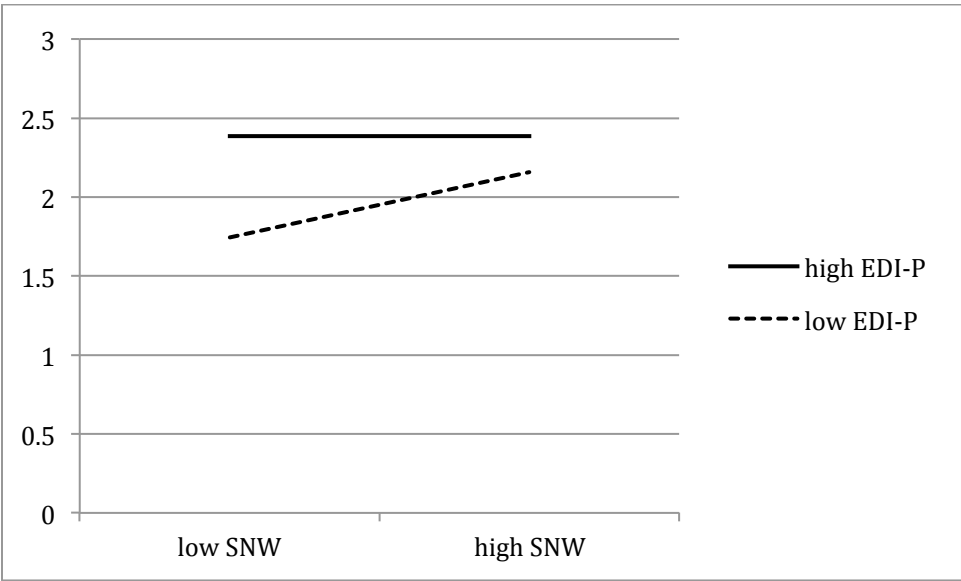


Figure 1. High and low levels of the predictors were determined by one standard deviation above and below the mean, respectively. SNW = social networking website use. EDI-P = Eating Disorder Inventory – Perfectionism Subscale.